

PASPALUM DISTICHUM L. VAR. *INDUTUM* SHINNERS (POACEAE)¹

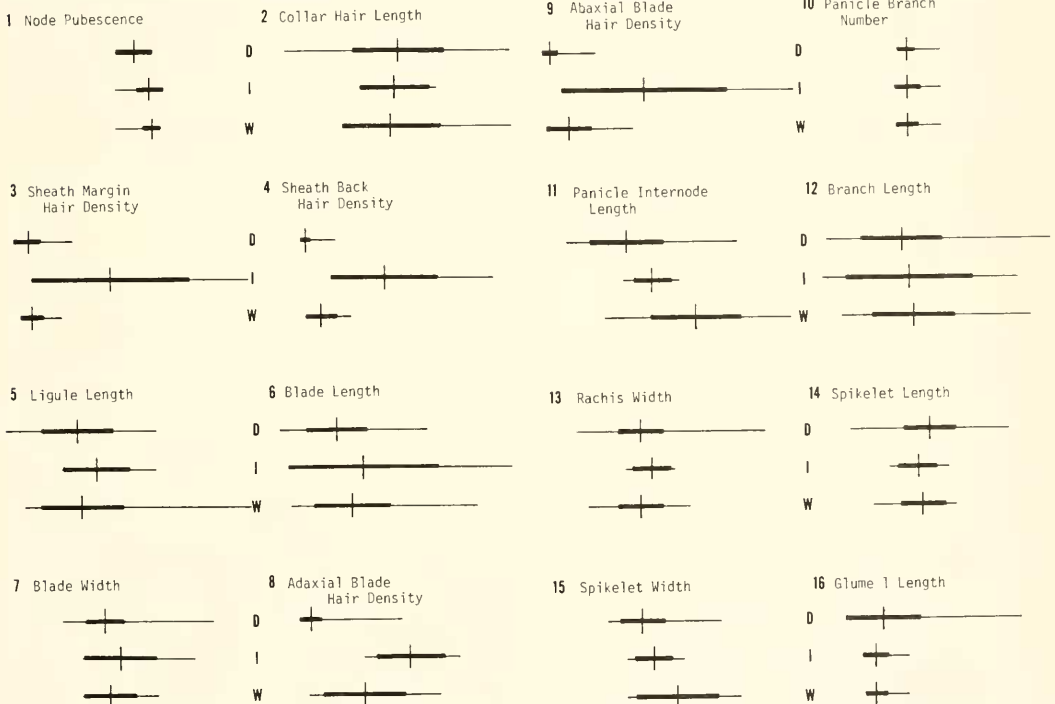
Kelly Wayne Allred²

ABSTRACT.— Glabrous *Paspalum distichum*, pubescent var. *indutum*, and pubescent plants of *P. distichum* from the western United States were compared. No morphological differences other than pubescence exist between the three forms. Plants from the eastern United States are generally more glabrous than those from western regions. The var. *indutum* represents an extreme pubescent form and is reduced to synonymy under *P. distichum*.

Paspalum distichum L.³ is the familiar “knotgrass” of swamps, swales, marshes, ditches, and muddy sites throughout much of the continental United States. It grows along both eastern and western coasts and through-

out the southern states. Knotgrass is also widespread in other warm-temperate to tropical regions of the world.

Material from Dallas County, Texas, with strongly hirsute sheaths and blades was



Figs. 1-8. Comparisons of the means (vertical line), range (horizontal line), and one standard deviation on each side of the mean (horizontal bar) for three forms of *Paspalum distichum*. D, glabrous *distichum* form; I, pubescent *indutum* form; W, pubescent western form. The features measured are as labeled.

Figs. 9-16. Comparisons of the means (vertical line), range (horizontal line), and one standard deviation on each side of the mean (horizontal bar) for three forms of *Paspalum distichum*. D, glabrous *distichum* form; I, pubescent *indutum* form; W, pubescent western form. The features measured are as labeled.

¹Journal Article 903, Agricultural Experiment Station, New Mexico State University, Las Cruces, New Mexico 88003.

²Department of Animal and Range Sciences, New Mexico State University, Las Cruces, New Mexico 88003.

³There is current controversy concerning the application of this name, involving also the names *P. vaginatum* Sw. and *P. paspalodes* (Michx.) Scribn. Until this matter is resolved, I will use "*P. distichum*" in the sense of Hitchcock (1951). See also Guédès (1976) and Renvoize and Clayton (1980).

described by Shinners (1954) as *Paspalum distichum* var. *indutum*. The variety *indutum* has been known only from the type locality and a few collections in the same county. Many plants of *P. distichum* from the western United States, however, including the intermountain region, also possess varying degrees of pubescence on the sheaths and elsewhere. This fact suggested the following queries. How does the var. *indutum* compare with the typical glabrous material of var. *distichum*, and with the pubescent material of the western United States? Are there other features in addition to pubescence that serve to distinguish any of the three forms? What is the geographic distribution of these forms? How many taxa are involved in this complex?

sentative sample of this taxon. From this sample, 235 specimens were examined and measurements taken for the following features: node pubescence, collar pubescence (length and number of hairs), sheath margin pubescence (density), sheath back pubescence (density), ligule length, blade length, blade width, adaxial blade pubescence (density), abaxial blade pubescence (density), number of inflorescence branches, length of the uppermost internode of the inflorescence, uppermost branch length, rachis width, spikelet length, spikelet width, and first glume length. Pubescence "density" was measured by the number of hairs touching or intersecting a standard 1 cm micrometer grid at 40X magnification. To help evaluate the relative degree of pubescence, a Pubescence Index (PI) was calculated for each specimen. The PI was the sum of the values for the pubescence features (node, collar, sheath margin, sheath back, adaxial blade, and abaxial blade). Totally glabrous plants would have a PI of zero,

MATERIALS AND METHODS

Plant specimens were gathered from various herbaria throughout the United States range of *Paspalum distichum* to give a repre-

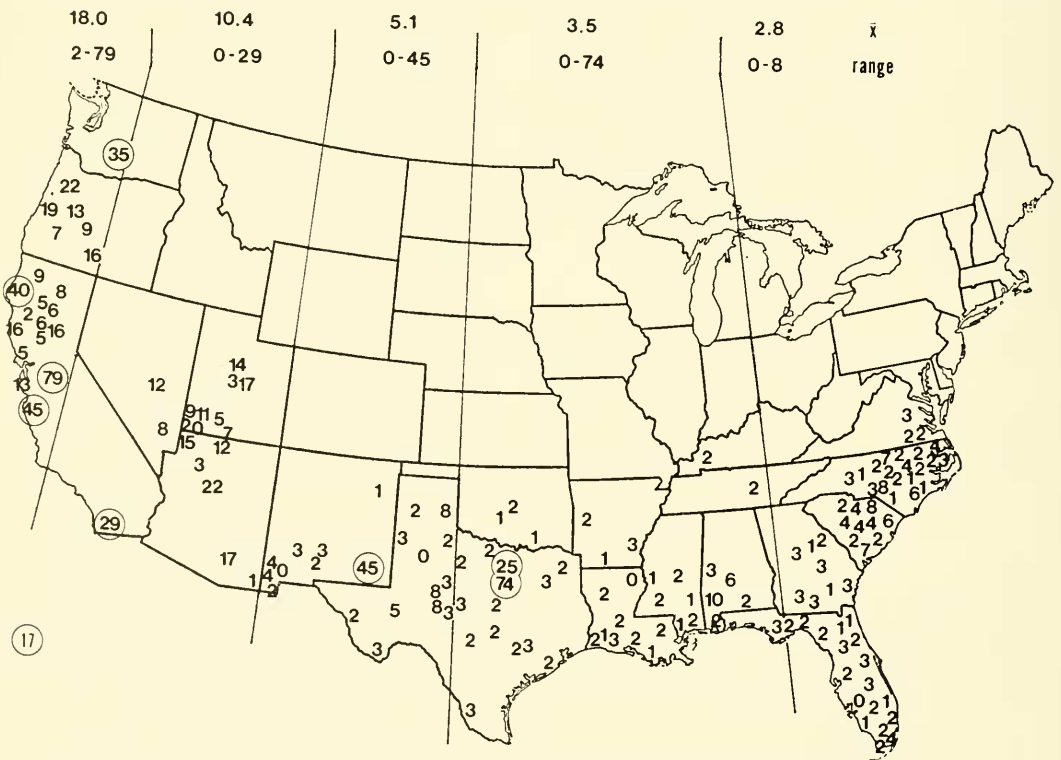


Fig. 17. Pubescence Index values of selected species of *Paspalum distichum* based on measurements of node pubescence, collar hair length, sheath margin hair density, sheath back hair density, adaxial blade hair density, and abaxial blade hair density. Circled PI values represent the *indutum* form. The map is not intended to represent the geographic distribution of *P. distichum*.

with greater PI values corresponding to increased pubescence.

RESULTS AND DISCUSSION

Most characteristics of *Paspalum distichum* are remarkably consistent throughout the continental United States. The three forms (glabrous *distichum*, *indutum*, and pubescent western) are essentially identical for all morphological features other than pubescence (Figs. 1-16). Even slight differences, such as the length of the panicle in ternode (Fig. 11) are not correlated with any other features. The obvious differences illustrated by Figures 1-16 are in the pubescence features, but these are the result of the a priori classification of the plants into three groups: glabrous *distichum*, pubescent *indutum*, and pubescent western forms.

The only possible differences, then, involve pubescence, which can be evaluated by the Pubescence Index (PI). The PI values for 161

specimens of knotgrass were plotted geographically (Fig. 17). (The remaining 74 specimens of the original 235 represented either duplicates or other specimens with identical PI values and from the same localities as those plotted on the map.) Specimens that were referable to the variety *indutum*, that is, with densely hirsute sheaths and blades as in the type specimen (*Shinners 10564*, SMU), were found in widely separate localities from Texas to Washington and had a PI range of 25-79. The type specimen of *indutum* had a PI value of 74.

There appears to be a rough cline in pubescence from more glabrous eastern plants (characteristic of *distichum*) to more pubescent western forms. Division of the United States into regions showed an average increase in PI values from 2.8 for eastern knotgrass to 18.0 for western plants (Fig. 17). The extreme pubescent forms representing variety *indutum* showed no such interrelationship with geographic distribution. High PI values

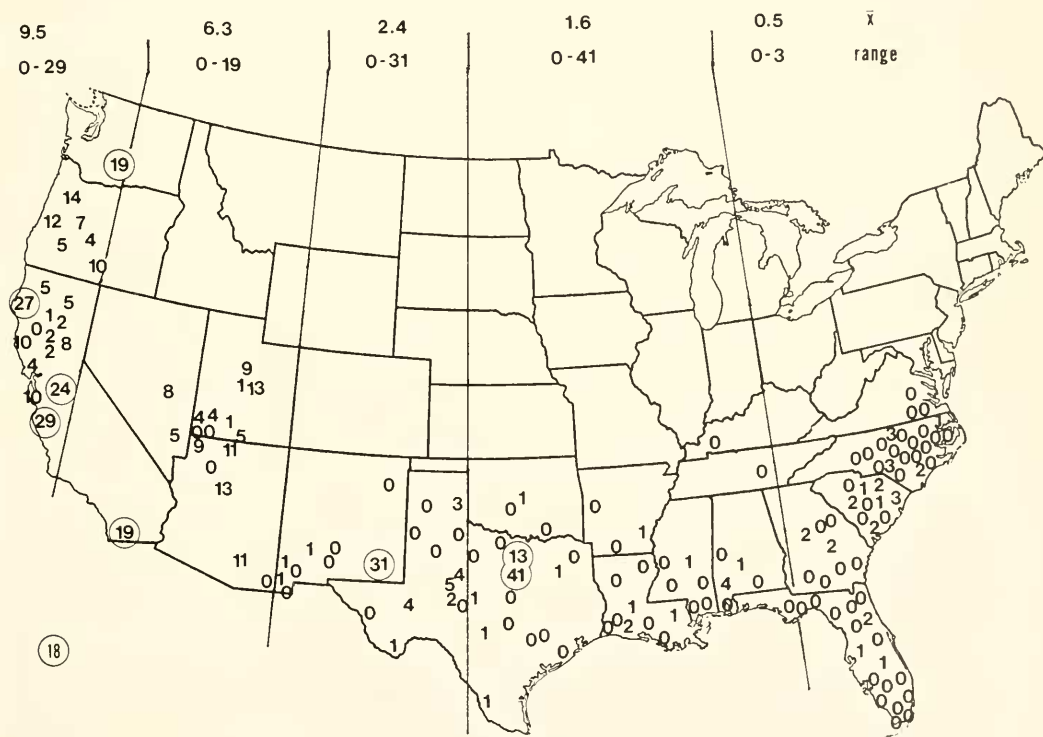


Fig. 18. Pubescence Index values of selected species of *Paspalum distichum* based on measurements of sheath back hair density, adaxial blade hair density, and abaxial blade hair density. Circled PI values represent the *indutum* form. The map is not intended to represent the geographic distribution of *P. distichum*.

(7-8) in eastern plants were due mainly to very pubescent nodes, collars, and sheath margins, but the pubescence of western plants involved not only the nodes, collars, and sheath margins, but also especially the sheath back and leaf blades. This is illustrated in Figure 18, where modified PI values from only the sheath back and blade surfaces are plotted. We see that eastern plants are glabrous or nearly so for these features (PI=0.5), but western plants are often pubescent (PI=9.5). The relationship, however, is far from absolute, as is shown by the range in PI for each region.

In conclusion, there is no morphological distinction between the nearly glabrous eastern knotgrass, the pubescent western forms, and the variety *indutum*. The variety *indutum* merely represents the extreme pubescent form of *Paspalum distichum*. Recognition of this taxon is untenable, with no basis in geographic distribution and no correlation with any other suite of features. The limits of such a taxon would be entirely arbitrary. Pubescence patterns in knotgrass do appear

in an east-west continuum, but there is no strong geographic distinction nor any feature other than pubescence that would allow a taxonomic segregation. The variety *indutum* and other pubescent plants are best viewed as pubescent forms of *Paspalum distichum*.

ACKNOWLEDGMENTS

Many thanks to the curators of the following herbaria for their generous loan of specimens: BRY, FSU, NCU, SMU, UNM, UTC, and WTU.

LITERATURE CITED

- GUÉDÈS, M. 1976. The case of *Paspalum distichum* and against futile name changes. *Taxon* 25(4):512.
- HITCHCOCK, A. S. 1951. Manual of the grasses of the United States. USDA Misc. Publ. 200. 2d rev. ed. Agnes Chase.
- RENVOIZE, S. A., AND W. D. CLAYTON. 1980. Proposal to reject the name *Paspalum distichum* L. *Taxon* 29(34):339-340.
- SHINNERS, L. 1954. Notes on north Texas grasses. *Rhodora* 56:31-32.